

# Highlights – Agents for Showcasing Innovation

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May 18, 2010

**Office of Integrative Activities**

*"Catalyzing Excellence in Research and Education"*





# What is a highlight?

A brief summary of a significant achievement.



# How are highlights used?

- To underscore to the public and Congress why NSF's investment in the EPSCoR program is essential.
- To provide evidence of outcomes for Committees of Visitors.
- To help NSF publicize the ways that investing in research and education activities advance discovery, innovation and education beyond the frontiers of current knowledge.



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## Science, Engineering & Education Innovation



NSF-funded projects are advancing knowledge, transforming society, strengthening the economy, and helping to keep America secure. Learn about projects, people, and infrastructure in every state and all fields of science and engineering.

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**Astronomy & Space**



**Biology**



# States & Territories



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Kansas

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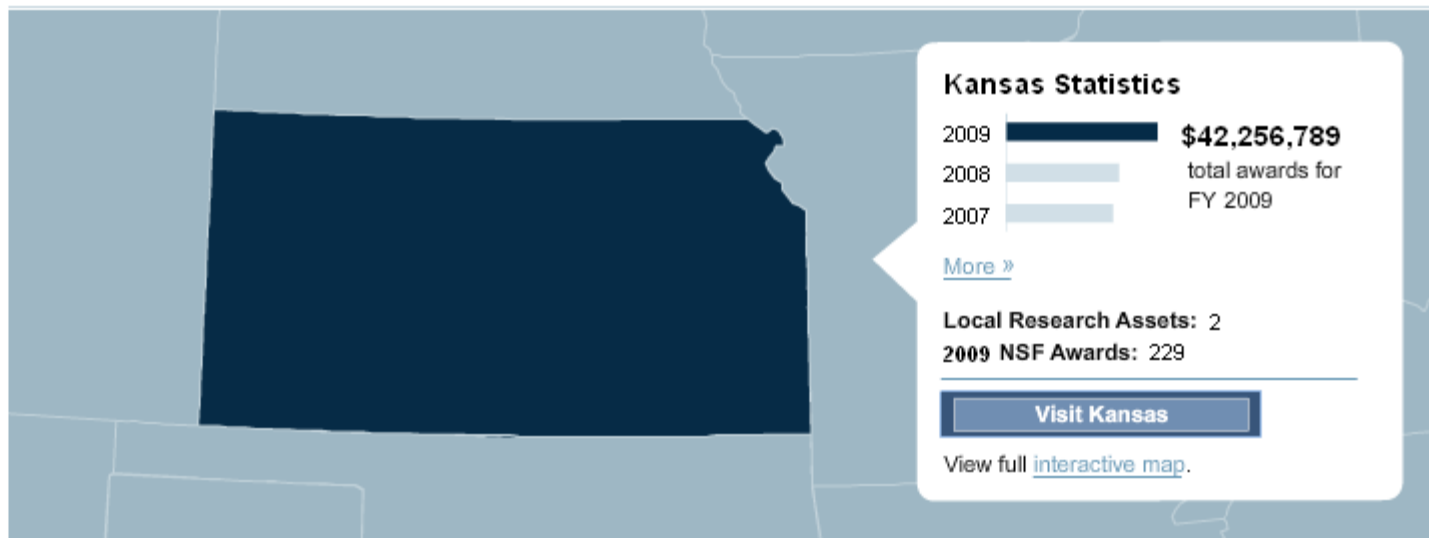
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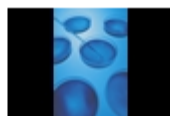
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## Kansas

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## Award Highlights



### Microbiologists Use GroEL to Study Proteins

Mark Fisher, of the University of Kansas, is putting GroEL to work determining the structure of other, more difficult to observe proteins....

Research Areas: [Biology](#), [Chemistry & Materials](#)



### Forming Impressions: Stereotypes and Status Matter

First impressions are based on two types of available information: categorical information, typically about group memberships and related stereotypes,...

Research Areas: [People & Society](#)



### Cyberinfrastructure and Biodiversity

## People of Distinction



[Sherry Helus](#)  
Mathematics  
Wamego, Kansas



[DeAnn Swofford](#)  
Science  
Gardner, Kansas



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#### South Dakota

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National Science

## South Dakota

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## Award Highlights



### [Researchers Produce More Efficient Solar Cells](#)

Diane Hinkens and her collaborators at South Dakota State University are designing, synthesizing and fabricating cheap, efficient solar cells that con...

Research Areas: [Earth & Environment](#), [Engineering](#)



### [New Nanoscale Materials May Improve Solar Cells](#)

Steve Smith of the South Dakota School of Mines and Technology and Stan May of the University of South Dakota are developing nano-composite materials ...

Research Areas: [Nanoscience](#), [Earth & Environment](#)

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## People of Distinction



### [David Ireland](#)

Science  
Rapid City, South Dakota



### [Rebecca Kitts](#)

Mathematics  
Pierre, South Dakota

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## Local Research Assets



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## Research Areas

NSF supports science and engineering research and education projects in 12 areas.



### Astronomy & Space

Astronomy may well be the oldest science of all. Human beings have been studying the Sun, moon, planets and stars for at least 5000 years.

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### Chemistry & Materials

Chemistry and materials research are the sciences of stuff—perhaps the only word that does justice to the myriad molecules and materials that we find in the world around us.

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### Earth & Environment

Earth's environments range from polar ice caps to hot, dry deserts, from dark ocean depths to high mountaintops.

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Engineers bridge the gap between what the mind can imagine and what the laws of nature allow.



### Biology

Biologists are life's detectives, discovering what "alive" really means.

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### Computing

The Internet, Google, and web browsers show how past progress in computing affects our daily lives. The cutting-edge systems under design now will have an enormous impact on society--and science.

[Learn More >>](#)

### Education

Since its establishment in 1950, NSF has supported student education -- from the early introduction to mathematics and science, through the college and postgraduate experiences.

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Mathematics is the natural language of science and engineering. It is about numbers, shapes, symmetry, chance



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## Research Assets

NSF investments support infrastructure and tools for conducting science and engineering research and education.



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Research aircraft and vessels supported by NSF

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### Facilities & Networks

National user facilities supported by NSF

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### Program Centers

Research and education centers supported by NSF

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### Telescopes & Observatories

Large multi-user instruments supported by NSF

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# Audience:

- Congress
- General Public (Industry)
- OLPA (Office of Legislative and Public Affairs)
- COV members

The highlight needs to be understandable to a general audience but still be exciting to a scientific audience. Technical information is useful but jargon and acronyms are confusing.



# What should be included:

Both intellectual merit and broader impacts

- Significance of the research
- Relevance to society
- Impact on other fields of science
- Participation by underrepresented groups
- Educational advances
- Long-term impact
- Outreach efforts that increased public understanding
- Innovations that have resulted in economic growth



# Make sure your highlight is about a result or an outcome.

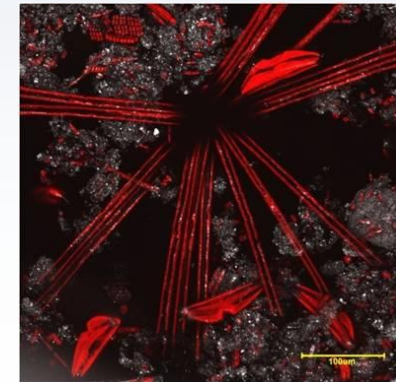
Getting an NSF award is not an outcome

Conducting research is not an outcome

We want to know about the **impact** of the funding.



# Include a high-resolution image or video





# The first line:

Start with a statement of what the research team has achieved, and then explain how the research solves a problem or overcomes an obstacle.

Example: “Prof. Blivett and her team at the University of Eutaw have discovered or achieved or developed XYZ. This was remarkable or useful or world-changing because ... or, this seminal development could lead to practical applications in the field of ...”



# Mention who funded the work:

Because highlights are used for a variety of purposes, it is helpful to include an explicit statement that NSF is supporting this work (this can usually be done very quickly in passing, e.g., "NSF-funded researchers at Stanford University have demonstrated ...", or "Astronomers working at NSF's Gemini Observatory have discovered...")

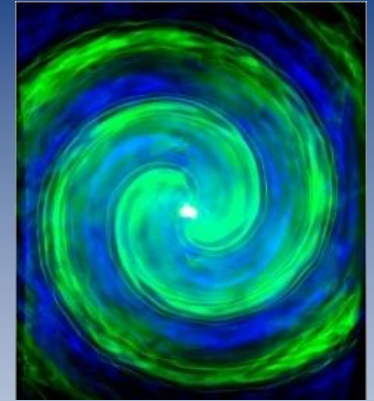


# First line-example

The NSF-funded Center for Coastal Margin Observation & Prediction (CMOP) has developed a new remote sensing device that opens the possibility for great advances in understanding and predicting salinity intrusion in estuaries. With major implications for ecological function, salinity intrusion is sensitive to climate change as well as to human activities ranging from navigation improvements to flow regulation.



# Simulating the Unseen



Black Holes collide in space all the time but nobody sees them. However, an award-winning, scalable, interactive computer simulation of such a collision and the gravitational waves the event would generate has been created by a team of 13 Louisiana State University researchers and students. Led by faculty at the LSU Center for Computation and Technology (CCT), the presentation and demonstration won first prize at the SCALE 2009 challenge at CCGrid09, a premiere conference for cluster and grid computing held in Shanghai, China.



# How to make a highlight interesting to varied audiences?

- Start and end with things that will be meaningful to everyone reading the highlight.
- If the highlight needs some technical information to make the significance understandable to a technical audience, put the technical text in the middle.



# Highlighting Innovation

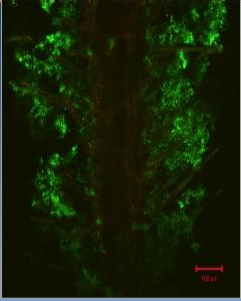
Prof. Joseph M. DeSimone and associates at the University of North Carolina – Chapel Hill have developed potentially transformative technology that is proving to have a significant impact in many fields, from medicine to space exploration to alternative energy options. The technology is based upon a material called PFPEs that is used for nanoscale pattern transfer and lithography. PFPEs exhibit positive attributes of both elastomers and rigid materials (such as glass) without the drawbacks of either. For example, PFPEs resist chemical attack and swelling by organic solvents; and can serve as precise molds for nanometer scale features.

A commercially available PFPE can be modified to incorporate a light-sensitive component. The process, called “PRINT®” can be used for nanoparticle fabrication. PRINT® technology is unique, providing for new sizes and shapes of particles that can be loaded with widely differing “cargoes” and the surface decorated with widely differing chemistries.

PRINT® technology has been used to demonstrate feasibility in a number of applications including MRI imaging of internal organs, artificial red blood cells (with the same size, shape and mechanical properties as natural RBCs), delivery of therapeutic and diagnostic agents for treatment of cancer, notably cervical and breast cancer, patterning of fuel cell membranes, Interdigitated microelements for photovoltaic cells, Interdigitated microelements for solar fuel production via photoelectrochemical cells, Lab-on-a-chip for on-demand production of radiochemicals for cancer treatment and Microfluidic device for upcoming Mars exploration mission.



# Are plants smart enough to recruit?



A study by researchers from the University of Delaware (UD) and Texas Tech University determined that plants are smart enough to use positive feedback mechanisms to recruit friendly neighbors, to deter pathogens and pests, and to fight pathogens by boosting their own innate resistance. While previous thinking held that infected plants were powerless to counter the spread of disease, this research found that plants can fight infection via chemical signaling. Using the model plant system *Arabidopsis thaliana* and the model pathogen *Pseudomonas syringae*, Prof. Bais' (UD) research team infected plants at the leaf surface to determine what would happen at the root level. The beneficial bacterium *Bacillus subtilis* bound to the plant's roots, and the plants secreted malic acid to signal the beneficial bacteria to come to the rescue. Next, the scientists added malic acid as a carbon supplement, and as they expected, the bacteria moved toward the roots more quickly. To test the theory, they infected a mutant plant that couldn't secrete malic acid and found that the bacteria did not bind to the plant's roots under infection.

Now that the common understanding that plants are passive has been turned on its ear—it turns out that plants can seek external help and are smart enough to deter pathogens.



# Integrate intellectual merit and broader impacts....



# Electric enthusiasm for gasoline-free transportation



A University of Alaska Fairbanks (UAF) Civil Engineering Student, Michael Golub, recipient of two Alaska EPSCoR undergraduate research grants, is making great strides in his efforts to document the viability of electric cars for use in Alaska's Interior. In addition to using his most recent EPSCoR grant to refine his studies of electric car emissions, he's also running electric car conversion classes throughout Alaska. He keeps on converting vehicles to electric, from the snowmachine to compact cars to his own riding mower. The project started in 2008 through his first research grant and by April 2009 he had converted eight vehicles.



Include an estimate of the number  
of people who participated in  
courses or events...



# Taking Nanoscience to the general public

In conjunction with NanoDays, a national event organized by Nanoscale Informal Science Education Network (NISE Net) researchers and students from the University of Puerto Rico (PR) took their research on NanoScience and Technology to the general public. PR Experimental Program to Stimulate Competitive Research (EPSCoR) Institute of Functional Nanomaterials (IFN) collaborated with other programs including PR Louis Stokes Alliance for Minority participation (LSAMP) and organized a two-day exhibition in the atrium of Plaza Las Americas, the 15<sup>th</sup> largest mall in the US.

The IFN trained 154 students from 5 public high schools.....

Five thousand people of all ages were enthralled by hands-on activities.....





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